

System design of the Monitor system for Space Electromagnetic Environments

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The system design of the Monitor system for Space Electromagnetic Environments (MSEE) is presented in the present paper. The objective of the MSEE is to monitor artificial turbulences due to human activities in space. Since space plasmas are essentially collisionless and kinetic energies are transferred through plasma waves and fields, artificial turbulences can be monitored by the measurement of plasma wave intensities. The MSEE consists of scattered sensor nodes and the center station, which acquires the data monitored by sensor nodes. The sensor node is designed based on the technology of plasma wave instruments onboard scientific spacecraft. However, since a lot of sensor nodes should be scattered around the target area in order to realize the multiple-point monitor, it should be compact and easy to be handles as much as possible. The necessary technologies to be developed for the MSEE are as follows: 1. Miniaturization of analogue electric circuits for the sensor node using the ASIC technology, 2. Development of compact electromagnetic sensors, 3. Development of the small power supply of the sensor node, 4. Establishment of the location estimation method of the sensor node, 5. Communication method of sensor nodes and center station for the data acquisition, 6. Establishment of the attitude estimation of the sensor node, 7. Measure for avoiding to be debris after the lifetime. We will summarize the status of these necessary developments and show the results of our system design of the MSEE as well as its specification.